



Explanatory Guide to the NASA Science Mission Directorate Educational Merit Evaluation Factors for Student Collaboration Elements

Version 1.1
September 2007

The most current version of this document can be downloaded at
<http://science.hq.nasa.gov/research/guide.htm>

If you have comments or questions, please send email to
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Change History

Version 1.0 July 2007	Initial Release
Version 1.1 September 2007	Updated contact email Corrected FAQ numbering

Preface

NASA's founding legislation, the Space Act of 1958, directs the Agency to expand human knowledge of Earth and space phenomena and to preserve the role of the United States as a leader in aeronautics, space science, and technology. High achievement in STEM education is essential to the accomplishment of NASA's mission. The NASA Science Mission Directorate has a portfolio of investments in Higher Education, Elementary and Secondary Education, Informal Education, and Outreach. It is a major contributor to the overall NASA education and outreach effort.

NASA continues the Agency's tradition of investing in the Nation's education programs and supporting the country's educators who play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will manage and lead the Nation's laboratories and research centers of tomorrow.

In 2006 and beyond, NASA will pursue three major education goals:

- Strengthen NASA and the Nation's future workforce—NASA will identify and develop the critical skills and capabilities needed to ensure achievement of the Vision for Space Exploration. To help meet this demand, NASA will continue contributing to the development of the Nation's science, technology, engineering, and mathematics (STEM) workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- Attract and retain students in STEM disciplines—NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines and careers critical to NASA's future engineering, scientific, and technical missions.
- Engage Americans in NASA's mission—NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive educational activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase Americans' science and technology literacy.

NASA delivers a comprehensive Agency education portfolio implemented by the Office of Education, the Mission Directorates, and the NASA Centers. Through the portfolio, NASA contributes to our Nation's efforts in achieving excellence in STEM education. The NASA Science Mission Directorate is a major contributor to the overall NASA education and outreach effort. The Directorate's Education and Public Outreach (E/PO) efforts are rooted in the efforts of its predecessor organizations, the Office of Space Science and the Office of Earth Science, that were merged in 2004 to become the Science Mission Directorate.

Three Outcomes serve to align all Agency education activities:

Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals through a portfolio of investments.

Outcome 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission.

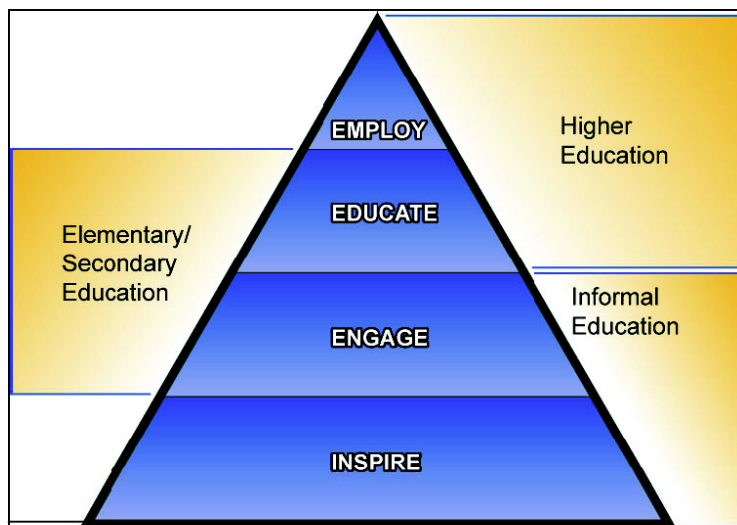


Figure 1

The Education Strategic Framework depicted in Figure 1 provides a conceptual basis for examining, guiding, and coordinating the NASA education portfolio.

The Education Strategic Framework is a strategic management tool that allows the Agency to monitor participant movement through education activities, with each category leading to the next. Education programs and projects draw from the category below them – as a key source for participants – and they connect participants to the category above them – providing a more

experienced and focused group and creating a measurable pipeline. If a participant’s imagination is captured by an inspirational activity, it will be far easier to interest that individual in more interactive engagement activities. As that individual becomes more engaged, he or she may search for opportunities to learn and eventually become employed in the aerospace industry - either in the private or public sector (e.g., NASA). Student opportunities at NASA include internships, scholarship programs, and student education employment programs (e.g., cooperative education). No matter where the individual decides to pursue their career, the goal is to direct a subset of the original audience through the pipeline to pursue a career in science, technology, engineering, or mathematics while drawing in new participants along the way.

SMD recognizes the value of directly involving undergraduate and/or graduate students in a spaceflight experience and provides the means to do so as part of Announcement of Opportunity mission solicitations. Investigators are encouraged to propose innovative Student Collaborations (SC) that inspire the students, engage them directly in the prospective missions, and contribute to their learning and appreciation of scientific exploration of space and the development of their work skills relevant to NASA missions. The SC may involve development of an instrument, investigation of scientific questions, data analysis or modeling, development of supporting hardware or software, and/or other aspects of the mission. The activities may involve flight or ground systems. For example, the Student Dust Counter aboard the New Horizons spacecraft, was provided by a student team, and included the students in the full spaceflight instrument experience, while creating a real-world vehicle for teaching other students.

The Evaluation Factors discussed in this guide are the means by which NASA SMD evaluates its Student Collaborations which are part of its education and outreach investments. They guide investigators in aligning their proposed efforts with the goals and objectives of NASA and SMD education and outreach. It is vital that everyone concerned (i.e., proposers, E/PO partners and

facilitators, reviewers) have a common understanding of what these factors mean in practice. This *Explanatory Guide to the SMD Educational Merit Evaluation Factors for Student Collaborations* is intended to support the development of such a common understanding. The Guide provides a brief elaboration of each of the SMD Educational Merit Evaluation Factors for Student Collaborations. These descriptions include references to pertinent information in the next section of the Guide that addresses Frequently Asked Questions (FAQ), and they also include "Indicators" that may be used by both proposers and reviewers to assess how well an E/PO proposal segment meets the Evaluation Factors.

The information contained in this document is intended to give a flavor of what exemplary Student Collaborations can be rather than a prescription for what to do. It is based on experience to date and thus the contents of the Guide will evolve over time with regular updates. For the latest version, please link through *E/PO Opportunities* at the NASA SMD Web site

<http://science.hq.nasa.gov/index.html>

If you have comments or questions, please send E-mail to

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Glossary

Announcements of Opportunity (AO) - This is generally used to solicit proposals for unique, high cost research investigation opportunities that typically involve flying experimental hardware provided by the proposer on one of NASA's Earth-orbiting or free-flying space flight missions. Selections through AO's can be for periods of many years, involve budgets of many millions of dollars for the largest programs, and usually are awarded through contracts, even for non-profit organizations, although occasionally grants are also used.

NASA Research Announcement (NRA) – An NRA is used to announce research interests in support of NASA's programs, and, after peer or scientific review using factors in the NRA, select proposals for funding. Unlike an RFP containing a statement of work or specification to which offerors are to respond, an NRA provides for the submission of competitive project ideas, conceived by the offerors, in one or more program areas of interest. NRAs may result in grants, contracts or cooperative agreements.

Cooperative Agreement Notice (CAN) - This is used to solicit ground-based research opportunities in which a fairly high degree of cooperation and interaction is expected between NASA and the selected institutions for completion of proposed research activities that further one of NASA's strategic objectives (e.g., to develop a research institute, an extensive educational/public outreach activity or provide technology transfer to develop a capability to enhance U.S. competitiveness). Further, the announced program intends a level of sponsorship, in the form of cost or resource sharing from both parties of the agreement. A CAN results in the award of a cooperative agreement.

TMCO Panel – A group of highly qualified subject area experts utilized by NASA to evaluate the Technical, Cost, Management, and Other Factors associated with major flight mission projects.

NASA Education Program – NASA has established five overarching Education programs under which NASA education efforts are undertaken. These are 1) Higher Education; 2) Elementary & Secondary Education; 3) Informal Education; 4) Minority Programs; and 5) e-Education.

Science Mission Directorate Education Project – Science Mission Directorate education project are an identifiable component of a Science Mission Directorate education program. These contribute to the NASA Education programs.

Science Mission Directorate Education Activity – an education activity is an identifiable component of a Science Mission Directorate education project.

Higher Education projects – beneficiaries are college/university faculty, undergraduate, graduate students, or postdoctoral researchers.

Elementary & Secondary Education projects – beneficiaries are educators and/or Kindergarten through grade 12 students.

Informal Education projects – beneficiaries may be of any age.

Public Outreach – A term used to identify activities and projects whose intent is to raise awareness of, or interest in, NASA, its goals, missions and/or programs, and to develop an appreciation for and exposure to science, technology, research and exploration. The term is usually associated with outreach to the public but may also be used in relationship to activities targeting specific groups/individuals such as those underserved and underrepresented in the

scientific, engineering, technology, and mathematics professions. It also includes efforts to engage members of these professions in NASA education and outreach efforts such as training of scientists and engineers in effective techniques for conducting education and outreach.

STEM – The disciplines associated with Science, Technology, Engineering, and Mathematics.

Student Collaborations – an element of an E/PO program that is designed to inspire students, engage them directly in the prospective missions, and contribute to their learning and appreciation of scientific exploration of space and the development of their work skills relevant to NASA missions. The SC may involve development of an instrument, investigation of scientific questions, data analysis or modeling, development of supporting hardware or software, and/or other aspects of the mission.

Investigators are encouraged to propose innovative Student Collaborations (SC) that inspire the students, engage them directly in the prospective missions, and contribute to their learning and appreciation of scientific exploration of space and the development of their work skills relevant to NASA missions. The SC may involve development of an instrument, investigation of scientific questions, data analysis or modeling, development of supporting hardware or software, and/or other aspects of the mission. The activities may involve flight or ground systems. For example, the Student Dust Counter aboard the New Horizons spacecraft, was provided by a student team, and included the students in the full spaceflight instrument experience, while creating a real-world vehicle for teaching other students.

SC proposals will be evaluated for overall merit. Overall merit of an SC is a combination of 1) the science/engineering alignment of the proposed SC investigation; 2) implementation merit of the SC based on technical, management, and cost feasibility of the SC, including cost risk, as expressed in terms of specific major and minor strengths and weaknesses; 3) and educational merit of the SC. This document only addresses factors that relate to the educational merit of the SC.

SMD Educational Merit Evaluation Factors for Student Collaborations

Sub-factors indicate areas of evaluation where strengths and weaknesses will be identified. The collection of strengths/weaknesses under each principal element will determine the rating for that principal element.

Educational Merit

1. Quality, Scope, Realism, and Appropriateness: SC educational objectives and their relationship to NASA's education outcomes defined in the *NASA Education Strategic Coordination Framework* are clearly defined, the SC mentorship and oversight have clear lines of responsibilities, and a high probability for successful achievement of education objectives is demonstrated.

2. Continuity: The SC draws from audiences that have demonstrated interest in NASA and connect participants to the next level of engagement and/or other NASA educational opportunities.

3. Evaluation: Projects and activities document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and annual performance goals. Evaluation methodology is based on reputable models and techniques appropriate to the content and scale of the activity, product, or program.

NASA also has a strong interest and commitment to meeting the needs of underserved and underrepresented groups in STEM. As part of this commitment SMD will use the program balance factor in selecting among proposals with SC elements of essentially equivalent overall educational merit.

Program Balance Factor

4. Diversity: Through the use of NASA SMD science, the SC reaches identified targeted groups. They contribute to the involvement, broad understanding, and/or training of underserved and/or underutilized groups in science, technology, engineering, and mathematics (STEM).

Indicators of Alignment with the SMD Educational Merit Evaluation Factors

To aid proposers in the preparation of their proposals, as well as to ensure that reviews are carried out on a consistent basis aligned with the NASA Education Goals and SMD implementation, this section offers further elaboration of each of the Evaluation Factors. Note that although creativity and innovation are certainly encouraged where appropriate, the factors do not focus on the originality of the proposed effort. This is a fundamental departure from standard scientific review factors and allows scientists to become actively involved in the kinds of Higher Education activities that have already proven to be meaningful, effective, and credible.

Educational Merit

1. Quality, Scope, Realism, and Appropriateness: SC educational objectives and their relationship to NASA's education outcomes defined in the *NASA Education Strategic Coordination Framework* are clearly defined, the SC mentorship and oversight have clear lines of responsibilities, and a high probability for successful achievement of education objectives is demonstrated.

Alignment Indicators include:

- Educational objectives of the SC are clearly and succinctly described. Program activities clearly flow from the goals and objectives.
- Essential information about each proposed E/PO activity and product is provided (e.g., who, what, when, where, why, how).
- Implementation is feasible for the specified intended audiences.
- The SC program management is clearly defined with clear lines of authority. Mentorship and oversight responsibility are defined and specified. All key personnel are identified and have institutional authorization to participate.
- There is a schedule and/or timeline for proposed SC activities or other clear indication of how activities will be phased with the proposed research program and/or appropriate mission milestones that is clearly aligned to the budget request.

2. Continuity: The SC draws from audiences that have demonstrated interest in NASA and connect participants to the next level of engagement and/or other NASA educational opportunities.

Alignment Indicators include:

- Methods are identified to draw participants from other NASA educational and/or outreach opportunities.
- Methods are identified to connect participants to other NASA educational and/or outreach opportunities.

3. Evaluation: Projects and activities document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and annual performance goals. Evaluation methodology is based on reputable models and techniques appropriate to the content and scale of the targeted activity, product, or program.

Proposals to continue or extend previously funded SMD efforts are required to include evaluation results of the prior effort.

Evaluation efforts should reveal lessons learned, and whether the proposed SC meets the stated goals and objectives and/or had other unanticipated effects. The formality and comprehensiveness of the evaluation will depend on the scope of the proposed SC. The program must collect, analyze, and report output and outcome data to a common NASA database to determine program effectiveness and meet the requirements of program stakeholders. Directions will be provided upon selection.

Indicators of appropriate evaluation plans include:

- The program is evaluated regularly by credible sources following professionally accepted standards for educational evaluations.
- Evaluation methods will provide useful information on the effectiveness of the proposed SC and the SC implements improvements based on evaluation evidence.
- Evaluations are based on models and techniques appropriate to the scale and type of SC.
- There is evidence that the forms of evaluation are based upon reputable models and techniques or are designed and applied by a reputable project partner who is knowledgeable in research and evaluation methods applicable to education and outreach efforts.

Program Balance Factor

NASA has a strong interest and commitment to meeting the needs of underserved and underrepresented groups in STEM. As part of this commitment SMD will use this program balance factors in selecting among proposals with SC elements of essentially equivalent overall educational merit.

4. Diversity: Through the use of NASA SMD science, the SC reaches identified targeted groups. They contribute to the involvement, broad understanding, and/or training of underserved and/or underutilized groups in science, technology, engineering, and mathematics (STEM).

Engaging more minorities and women in careers and greater interest in science and engineering has become an increasingly critical need in America (see [FAQ 4](#)). Indicators that the proposed E/PO projects/activities contribute to underserved and/or underutilized groups (see [FAQ 6](#)) may include one or more of the following:

- The program serves individuals from underrepresented groups and ensures accessibility to people with disabilities.
- The program promotes opportunities for faculty at minority-serving institutions to engage in research consistent with NASA's requirements. Approaches include

utilization of partnerships or having substantive linkage with one or more minority universities such as: Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs).

Frequently Asked Questions

SMD E/PO Policies

1. [What is NASA's Science Mission Directorate \(SMD\) commitment to Education and Public Outreach \(E/PO\)?](#)
2. [How does the SMD E/PO program relate to the NASA Education Program?](#)
3. [Why has NASA's Science Mission Directorate \(SMD\) made a major commitment to Education and Public Outreach \(E/PO\)?](#)
4. [Why is SMD placing an emphasis on outreach to underserved and/or underutilized groups?](#)

FAQs: Content of Proposal Segments

5. [What is evaluation and how important is it to include as a funded part of my E/PO program?](#)
6. [What is meant by "underutilized" and "underserved" groups in science and technology?](#)

SC Element Review

7. [What is the E/PO proposal review process?](#)

Answers to Frequently Asked Questions

FAQs: SMD E/PO Policies

1. **What is NASA's Science Mission Directorate (SMD) commitment to Education and Public Outreach (E/PO)?**

Historically NASA has placed a premium on training the next generation of scientists via the support of graduates and postgraduates in their usual scientific roles on research proposals. Such support for future scientists is important and ongoing. The SMD E/PO program expands the SMD role in education to meet national needs for improving pre-college science education and enhancing general literacy in science, mathematics and technology. This means supporting the involvement of the science community in partnership with the education community to enhance science, technology, engineering, and mathematics (STEM) education and the public understanding of science. SMD is devoting a substantial level of resources toward its E/PO program. Every NASA Science Mission Directorate (SMD) flight project proposal (AO) is *required* to include a meaningful segment on E/PO.

2. How does the SMD E/PO program relate to the broader NASA Education Program?

There is only one NASA Education program. It is coordinated by the Office of Education. Management of various programs is vested in several organizations including the Office of Education, NASA Directorates (such as the Science Mission Directorate), and the NASA Field Centers.

3. Why has NASA's Science Mission Directorate (SMD) made a major commitment to Education and Public Outreach (E/PO)?

The NASA science research and development community has earned an international reputation for outstanding scientific achievement. Discoveries are abundant as scientists probe into the depths of a familiar night sky or our own home planet. This discovery-rich quality also makes Earth and space science an inspirational context for science education and public outreach (E/PO). The SMD E/PO strategy reflects the conviction that with key partnerships and cleverly leveraged efforts, the Earth and space science community can take greater advantage of its inspirational assets to have a powerful, positive impact on education in America.

Successful science education produces a science literate public who appreciates the nature of science; science literate educators, journalists, artists, politicians and business leaders who can recognize and articulate the value of science in society; and a diverse, high-quality technical work force. It is clearly in the enlightened self-interest of the space science community to bring the power of its inspirational endeavors more deliberately to bear in support of these outcomes.

4. Why is SMD placing an emphasis on outreach to underserved and/or underutilized groups?

Profound changes in the composition of the population of the United States are now taking place. According to projections by the Bureau of the Census:

- By 2030, the total elementary school age population of the United States will be equally divided between non-Hispanic whites and all other racial/ethnic groups combined.
- From 2030 to 2050, Native Americans, Asian/Pacific Islanders, Hispanics, and African Americans will together far outnumber non-Hispanic whites in elementary schools, high schools, and new entrants into college and the workforce.
- By 2050, non-Hispanic whites will decline to 53 percent of the total US population (all ages).

Thus, meeting the future needs of a society based on science and technology will require the involvement of individuals from groups who, at the current time, are not as effectively utilized as they should be in science and technology. In addition, these underserved and/or underutilized groups are significantly more underrepresented in space science than they are in science and technology as a whole. SMD is committed to playing a substantive role in addressing the need for outreach to these underrepresented groups to help ensure the future supply of scientists and engineers, and educate all people about the important role that science and technology plays in their lives (see FAQ [6](#)).

FAQs: Content of Proposal Segments

5. What is evaluation and how important is it to include as a funded part of my E/PO program?

Evaluation of E/PO efforts is essential, particularly for larger scale projects/activities. The general goal of all E/PO efforts is to accomplish something (e.g., teach, inform, excite, etc.). While it is possible to accomplish something without realizing it, it is also possible to believe falsely that there have been accomplishments in the absence of validating evidence. It is thus necessary to investigate how well the outcomes of E/PO efforts actually match with their intended effectiveness and impact. Just as scientific claims must be testable and tested before they are accepted, so must claims about E/PO accomplishments be substantiated with evaluation.

6. What is meant by "underutilized" and "underserved" groups in science and technology?

The terms "underutilized" and "underserved" have special meaning in this context. In Equal Opportunity organizations, the operative phrase is "underrepresented in science and engineering" which is currently defined as individuals of Hispanic, African American, Pacific Islander, and Native American origins. In particular, all federal agencies, including NASA, have legislative and White House mandates to increase their support to minority universities. Such universities include Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and other institutions certified by the Department of Education as having more than 50% combined minority undergraduate enrollment. A complete list of all accredited minority institutions is available from the Department of Education at <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html> (also see [Appendix H](#)).

The terms "underutilized" and "underserved" encompass "underrepresented," but also include more. Use of the term "underutilized" recognizes that there are groups of people who have the talent and ability to participate in the SMD program and thus should be involved, but for one reason or another, they are not now involved. Such groups obviously include minorities but also include women and the physically challenged.

Use of the term "underserved" recognizes that there are people in areas where goods or services are in short supply. For example, this term is usually applied to individuals in small towns, rural communities, or in economically depressed areas where key services are frequently not available. The usage of "underserved" in this context is also intended to include groups with which NASA has not historically had a significant relationship, such as students at community colleges.

FAQs: SC Element Review

7. What is the E/PO proposal review process?

Student Collaborations are a part of the E/PO effort of missions and are evaluated according to the Education Evaluation Factors. Separate reviews of the science, implementation, and educational merit are made.

A science panel evaluates the Science Merit. The TMCO panel evaluates Implementation Merit [technical feasibility, separability, and cost factors]. Educational Merit is evaluated by an education panel,

The process of handling SC element follows the known best and fair practices for proposal review in current use throughout SMD. (See the *Guidebook for Proposers Responding to NASA Research Announcements*, Appendix C, which is available at <http://www.hq.nasa.gov/office/procurement/nraguidebook/>.)

To ensure quality and consistency in the review process, experience to date has demonstrated that review panels for the E/PO segment must include both educators and scientists. The substance of these reviews is conveyed to proposers as part of their usual debriefings.

In order to avoid “Conflict of Interest” during the review process, it is essential that all key personnel including the E/PO lead for AOs are identified and names and addresses of all current institutions of employment be provided.

A sample Review Form is provided in Appendix C.

Appendices

Appendix A

Key NASA Links

NASA Strategy and E/PO Implementation Documents

NASA Office of Education Strategy

<http://education.nasa.gov/about/strategy/index.html>

2006 NASA Strategic Plan

http://www.nasa.gov/pdf/142302main_2006_NASA_Strategic_Plan.pdf

NASA Information

NASA Science Mission Directorate

<http://science.hq.nasa.gov/>

NASA Office of Education

<http://education.nasa.gov/>

Resources for Researchers and Educators

Overviews of SMD Missions and their E/PO projects

<http://science.hq.nasa.gov/research/overviews/index.html>

Earth Science Education Catalog

<http://www.science.hq.nasa.gov/education/catalog/index.html>

NASA Space Science Education Resource Directory

<http://teachspacescience.stsci.edu/cgi-bin/ssrtop.plex> The Education Resource Directory provides Internet access to top-quality educational resources produced by NASA's Space Science Education and Public Outreach programs

Educators' Resources: Teacher's guides, education programs, and learning resources

<http://science.hq.nasa.gov/education/index.html>

NASA Science Mission Directorate Education and Public Outreach Annual Reports

<http://ossim.hq.nasa.gov/ossepo/>

Voyages in Education and Public Outreach: A NASA Space Science Newsletter

<http://science.hq.nasa.gov/research/newsletters.htm>

Voyages is a newsletter that serves as a vehicle for sharing the NASA Space Science's latest events and accomplishments in Education and Public Outreach. Past and current issues are available here.

Abstracts of Space Science NRA E/PO Proposals

http://research.hq.nasa.gov/code_s/archive.cfm

E/PO proposal abstracts for 2000-2004 are available. Select the year of interest from this URL.

Earth Explorers Awards from 2004

http://research.hq.nasa.gov/code_y/nra/current/NNH04ZYO006N/winners.html

Space Science Access: Bringing the Universe to Museums and Planetariums

<http://mo-www.harvard.edu/spacescienceaccess/>

NASA's Science Mission Directorate recognizes that planetariums, science centers, and museums are vital venues for astronomy and space science education. This Web site aims to support the efforts of these informal science education organizations.

Space Science Media Needs of Science Center Professionals

<http://cse.ssl.berkeley.edu/spacescience.pdf>

The Sun-Earth Connection Education Forum interviewed twenty-nine science center professionals to explore ways to better meet their media needs. ("Media" refers to images, animations, simulations, and videos, etc., available via the web.) Key recommendations are discussed.

Small and Medium Size Planetarium Projects

<http://analyzer.depaul.edu/NASABroker/GLPA/Default.htm>

Resources geared to the needs of Small and Medium Size Planetariums.

Special Needs Resource Group

<http://serch.cofc.edu/serch/special/snrg.htm>

This group provides SMD mission planners/principle investigators and product developers with guidance, support, and product enhancement strategies; hence improving the usability of SMD products by audiences concerned with the education of individuals with special needs.

NASA Educational Resources In Other Languages

http://www.uidaho.edu/ed/nasa_rerc

A comprehensive list of over 50 NASA programs and resources in Spanish and many other languages. Click on the link *Materials in Other Languages*.

Trends in International Mathematics and Science Study

<http://nces.ed.gov/TIMSS/>

Trends in International Mathematics and Science Study (TIMSS, formerly known as the Third International Mathematics and Science Study) resulted from the American education community's need for reliable and timely data on the mathematics and science achievement of our students compared to that of students in other countries. TIMSS is the most comprehensive and rigorous assessment of its kind ever undertaken. Offered in 1995, 1999, and 2003, TIMSS provides trend data on students' mathematics and science achievement from an international perspective.

Archives

History of OSS E/PO Program

http://science.hq.nasa.gov/research/Cospar_Manuscript.pdf

"Partners in Education: A Strategy for Integrating Education and Public Outreach into NASA's Space Science Programs"

<http://spacescience.nasa.gov/admin/pubs/edu/educov.htm>

"Implementing the Office of Space Education & Public Outreach Strategy"

http://spacescience.nasa.gov/admin/pubs/edu/imp_plan.htm

"Implementing the Office of Space Science Education/Public Outreach Strategy: A Critical Evaluation at the Six-Year Mark"

http://spacescience.nasa.gov/education/resources/evaluation/OSS_EPO_Task_Force_Report

OSS E/PO Evaluation Report (2004), Lesley University

http://science.hq.nasa.gov/research/OSS_EPO_Phase_III_Report.pdf

Earth Science Education Roadmap 2005

<http://science.hq.nasa.gov/research/ES-Education-Roadmap.pdf>